IV. REMARKS

1. The Abstract is amended to place it in proper form. Claim 25 is amended to address the 35 U.S.C. §112, second paragraph rejection.

2. Applicant appreciates the Examiner's indication of allowable subject matter. However, for the reasons stated below, Applicant believes that the claims should be allowable in their present state.

3. Claims 1-5, 17-22, 24, 25, 32-34 and 37-43 are not unpatentable over Parish et al. (U.S. Patent No. 5930243 ("Parish") in view of Yun et al. (U.S. Patent No. 6,047,189 ("Yun") under 35 U.S.C. §103(a).

Claim 1 recites in part that the data transmission frames (FR) comprise "at least uplink timeslots for performing data transmission from the terminals to the access point and downlink timeslots for performing data transmission from the access point to the terminals via a wireless communication channel." The "terminals can be allocated one or more timeslots" of the frames. This is not disclosed or suggested by Parish in view of Yun.

Parish, in Col. 6, lines 3-30 and FIG. 4 does not disclose or suggest how timeslots are allocated as is described and claimed by Applicant. Parish only discloses that a "group" is defined as one set of 4 TX and 4 RX timeslots and that a "group" always begins with the first TX timeslot. (Col. 6, lines 18-21).

Parish also mentions that the PHS system has a dedicated frequency and timeslot for a control channel. (Col. 6, lines 9-

11). However, this still does not describe the "allocation" of timeslots as is claimed by Applicants.

Claim 1 of Applicant's invention also recites that in at least part of the frames, at least partly simultaneous timeslots are allocated to at least two terminals where the "spatial signature" of at least two terminals is determined. This is not disclosed or suggested by Parish. Parish in Col. 2, lines 3-14, referred to by the Examiner, does not disclose or suggest "spatial signatures", as described and claimed by Applicant.

In Applicant's invention, as described on page 2, lines 19-20, spatial signatures are "properties of the radio channel between the terminal and the base station." Parish only discloses that SDMA is "spatial division multiple access" and that SDMA can be used with FDMA, TDMA and CDMA. (Col. 2, lines 4-14). SDMA can be used with FDMA, TDMA and CDMA to enable communication between the terminals and the base stations on the same conventional channel.

Then, as noted by the Examiner, Parish does not teach that the results of measurements are used to select the terminals to which simultaneous timeslots are to be allocated.

The Examiner's statement that it is inherently known that the access point can communicate with a single terminal at a time is respectfully traversed as it applies to Applicant's invention. It is not inherent or obvious that first, at least partly simultaneous timeslots are allocated for terminals and after the measurements of spatial signatures, simultaneous timeslots can be allocated for the selected terminals as is claimed.

The combination of Yun with Parish does not overcome at least the above-noted deficiencies. Neither Parish nor Yun teach how the timeslots are allocated. A first difference between Applicant's invention and the combination of Parish and Yun is that in Applicant's invention according to claim 1, the measurement results are used to select terminals to which the simultaneous timeslots are allocated to. Another difference between Applicant's invention as recited in claim 1 and the combination of Parish and Yun is that in the timeslot allocation process, the measurements are done so that no other terminal transmit signals to the access point. Neither Yun nor Parish teach that in order to enable simultaneous communications between multiple terminals and the access point, the measurements for spatial signatures is accomplished with a single terminal at a time, transmitting signals to the access point ("on the basis of a signal transmitted by the terminal (MT1) to the access point"). The Examiner refers to FIG. 4 and Col. 4, lines 46-65 of Yun as teaching these features of claim 1. However, FIG. 4 of Yun only relates to the timeslots assignments used for sending and receiving in the TDMA-TDD system. (Col. 4, lines 47-49) The text referred to only explains the basics of SDMA, not the issue of channel allocation or how a spatial signature is measured and used to allocate timeslots, as is described and claimed by Applicant.

Thus, each feature of Applicant's invention is not disclosed or suggested by Parish in view of Yun. Therefore, claims 1, 37 and 38 should be allowable. Claims 2-36 should be allowable at least by reason of their respective dependencies.

With respect to claim 2, claim 2 recites that "simultaneous transmission and/or reception for at least two terminals is implemented on the basis of selection of terminals (MT1-MT4) made on the basis of said measurement results." This is not disclosed or suggested by the combination of Parish and Yun. Parish, in Col. 1, lines 45-49, explains that the base station can communicate simultaneously between several terminals, thanks to SDMA. There is no mention about making a decision about simultaneous communication based on measurement results. Thus, claim 2 is not disclosed or suggested.

With respect to claim 4, Parish describes using the parameters and storing the known characteristics of the first signal. (Col. 5, lines 21-35). This is also explained in Col. 9, lines 6-18 with respect to the parameter estimation process. However, that is not what the claim 4 of the present application teaches. Claim 4 recites that the "stored signals are used to determine "time and frequency offsets of the terminal." In Applicant's invention, the mere transmitted signal from the terminal to the base station can be used for further estimations by storing it (page 10 lines 13-16). Parish does not teach this. Thus, claim 4 should be allowable.

Claim 5 recites that the "measurements are used to determine the position of the terminal." This is not disclosed or suggested by Parish in view of Yun. The reference to Parish, Col. 10 lines 14-30, talks about position of the burst in time, not about the position of the terminal. This is evident from the sentence *"[i]n the first preferred embodiment, it is assumed that initially the position in time of the burst is known to within +/- 2 symbols (+/- 16 samples)."* This does not teach that the

measurements are used to determine the position of the terminal, as is claimed by Applicant.

Claims 17 and 40 recite that the access point uses an array of several antennas having a variable directional pattern. This is not disclosed or suggested by Parish in view of Yun. Parish does not teach several antennas having "variable directional patterns." In Applicant's invention, the directional patterns are needed to direct the transmission to the specific terminal. Thus, claims 17 and 40 should be allowable.

Claims 18 and 41 recite that the access point receives the signals transmitted by the terminal through the antenna array and that the signal received is used in the measurements. The reference to Parish, Col. 4, lines 21-24, does not disclose or suggest this.

Claims 20 and 43 recite that the timing and frequency offsets of the terminal are measured with at least two different antennas and that an "average" is formed of the timing and frequency offsets measured with "different" antennas. The referred to section of Parish (Col. 17, lines 18-22) only describes averaging the phase angle error. Thus, claims 20 and 43 are not unpatentable.

With respect to the rejection of claim 32, Col. 1, lines 36-45 of Parish does not teach that the position of timeslots to be used for estimation of terminals to be served simultaneously is selected to be substantially the same as the position of simultaneous uplink and downlink timeslots to be allocated to these terminals later on in the data frame. Rather, Parish teaches that a communication channel between base station and

terminals can be formed by a frequency, time or code or a combination of them. Thus, claim 32 is allowable.

With respect to claim 34, Col. 5 lines 3-5 of Parish teaches which parameter to estimate from the received signal when there are no stored estimates. The first parameter to be estimated is time alignment. The idea of different sets is explained in Col. 4 lines 50-65. Parish does not disclose or suggest that the terminal only transmits a training sequence or empty packet in the time slot used for estimation. Thus, claim 34 should also be allowable.

It is also respectfully submitted that there is no motivation to combine Parish and Yun to achieve Applicant's invention as claimed.

Parish provides a method for estimating time alignment and frequency offset parameters for an antenna-array based communication system.

In Parish, the method involves using a communication system comprising at least one remote terminal and at least one base station. Each base station has m antenna elements. The system has a set of one or more parameters, consisting of a first set of parameters already estimated and a second set of parameters to be estimated. The method involves determining an estimate of one or more parameters of the second set. A first signal of known characteristics is transmitted, and received as several (m) received signals at m corresponding antenna elements.

A cost function is determined that is related to the one or more parameters of the second set. The determination uses a copy signal determined from samples of the signals of the first set of received signals using a copy weight vector. If the first set is

not empty, the determination further uses estimates one or more parameters of the first set, and finally the known characteristics of the first signal. The estimate of the parameters of the second set are selected as those that minimize the cost function.

Yun relates to channel assignment in a cellular multiple access system. The method adaptively determines the power required for establishing an acceptable quality connection (see Abstract).

Applicant's invention is directed to arranging measurements for spatial signatures so that simultaneous transmissions for terminals can be allocated in the most efficient way. The teachings of Parish and Yun in this regard are disparate and cannot be combined to achieve Applicant's invention. Neither Parish nor Yun relate to allocating timeslots for terminals. Neither Parish nor Yun describe using the measurements to select the terminals for which simultaneous timeslots are to be allocated, as admitted by the Examiner. Further, neither Parish nor Yun teach that <u>for performing the measurements</u> (for arranging the communication between terminals and an access point) only the measured terminal can send signals to the access point and the other terminals may not transmit signals to the Access Point.

Applicant's time slot allocation scheme based on measurements would not have been obvious to a person skilled in the art based on Parish and Yun, because Parish and Yun do not describe that in a space division multiple access system (SDMA) information could not be sent to the access point simultaneously with other terminals (page 1 lines 12-15 of the present application and Parish Col. 1 line 66 to col. 2 line 12). Parish and Yun only describe how simultaneous transmission is possible in space division multiple access scheme.

Therefore, as the present invention relates to SDMA, it would **not** be obvious to allocate single transmission timeslots to multiple terminals to take better use of the network capacity. As explained on page 3 lines 6-21 of the present application, simultaneous transmissions from terminals would require them to have separate training sequences. However, Applicant's invention only requires one training sequence as the uplink transmission measurement in an SDMA scheme is done by allowing only one terminal to be sending a signal to the Access Point at a time. After determining the spatial signatures of multiple terminals the terminals to be sending simultaneously are selected based on the measurements done. Thus, motivation as required under 35 U.S.C. §103(a) is not present.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

A check in the amount of $450.00 is enclosed for a two-month extension of time. The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

6 July 2005

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